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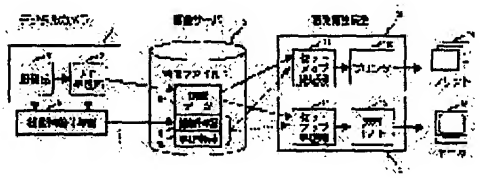
(54) IMAGE REPRODUCING METHOD FOR REPRODUCING DIGITAL IMAGE DATA OBTAINED BY DIGITAL CAMERA AND DIGITAL CAMERA USED FOR THE METHOD

(57)Abstract:
PROBLEM TO BE SOLVED: To immediately reproduce the photographic image with high quality without repeating teat printing for improving image quality or fine adjustment by the recognition of a monitor at the time of reproducing the photographic image taken by a digital camera.
SOLUTION: The digital camera 1 having a function (photographing information imparting part 6) giving photographing information 9 showing a photographing condition to digital image data 8 obtained by photographing executes photographing. An image reproduction device 3 executes an image processing for improving image quality on image data 8 obtained by photographing by using photographing information 9 given to image data 8 in a setup processing part 11 and image data is reproduced as print 14 or the display image of the monitor 15.



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* NOTICES *

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CLAIMS

[Claim(s)]
[Claim 1] The digital image data to which the aforementioned photography information was given with the digital camera which has the function which gives the photography information showing photography conditions to the digital image data acquired by photography are obtained. The digital image data with which the aforementioned photography information was given are memorized to a predetermined storage. The image reconstruction method characterized by performing the image processing for raising the quality of image of the aforementioned digital image data to the digital image data memorized by the aforementioned storage using the aforementioned photography information given to these digital image data, and reproducing the digital image data by which the image processing was carried out [aforementioned].
[Claim 2] The image reconstruction method according to claim 1 characterized by to perform the image processing for raising the quality of image of the aforementioned digital image data using the aforementioned processing conditions which gave the various processing conditions of this image processing to the aforementioned digital image data, and were given to these digital image data to the digital image data which memorized to the aforementioned storage and were memorized by the aforementioned storage after performing the aforementioned image processing, and to reproduce the digital image data by which an image processing was carried out [aforementioned].
[Claim 3] The picture reproducer characterized by having an image-processing means to perform the image processing for raising the quality of image of the aforementioned digital image data using the photography information which is the picture reproducer used for the method of a claim 1, and was given to the aforementioned digital image data, and a reproduction means to reproduce the digital image data processed by this image-processing means.
[Claim 4] The picture reproducer characterized by having an image-processing means to perform the image processing for raising the quality of image of the aforementioned digital image data using the processing conditions of the aforementioned image processing which is the picture reproducer used for the method of a claim 2, and was given to the aforementioned digital image data, and a reproduction means to reproduce the digital image data processed by this image-processing means.
[Claim 5] The digital camera characterized by having a photography information grant means to be the digital camera used for the method of claims 1 or 2, and to give the aforementioned photography information to the aforementioned digital image data.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] this invention relates to the image reconstruction method for reproducing the digital image data acquired with the digital camera on a printer or a monitor, equipment, and the digital camera that uses it for the method.
[0002]
[Description of the Prior Art] Generally the quality of image of a photograph, especially a result of color photography change a lot according to exposure conditions. Therefore, AE mechanism for setting up proper light exposure corresponding to the luminosity at the time of photography or a photographic subject's luminance distribution is carried in the camera. However, since there is a limitation also in AE mechanism and the performance has a difference with a camera, an always good photograph cannot necessarily be taken.
[0003] For this reason, in the photograph store, in case it prints so that a customer can be provided with the high definition possible photoprint, exposure conditions were adjusted and amendment processing has been performed for the excess and deficiency of exposure, or the bias of a color. In this case, since the image processings which should be performed with the photograph processed with a natural thing differ, Judging the delicate difference in the picture displayed on the monitor based on experience repeat and perform adjustment of image-processing conditions, or Creating the print with which searches for the optimal image-processing conditions, performs an image processing according to the image-processing condition searched for, and a customer is finally provided is performed by creating the test print of many sheets and checking the result condition.
[0004] In the case of the electronic camera (henceforth a digital camera) using the electronic image pck-up element, not much advanced processing cannot be performed in many cases in a camera side from restrictions of cost or the operation time. A thing not much highly efficient as an AE mechanism may not be carried noting that it is enough as quality of image if the picture displayed on the liquid crystal display monitor attached to a CRT monitor or a camera is a picture of quality-of-image tolerance to which a latus monitor display image can be equal to observation comparatively, in order to use the picture acquired without minding a photograph store in the case of a digital camera in many cases as it is. For this reason, in reproducing the digital image data photoed with the digital camera as a print, it is not easy to obtain the result optimal as a narrow print picture of quality-of-image tolerance, and work time-consuming [, such as a repeat of the above test prints,] is needed.
[0005]
[Problem(s) to be Solved by the Invention] However, it not only takes time, but the amendment by the above trial and error requires the cost for a test print. Moreover, there is also a problem that a difference arises in a result with experience of the operator who adjusts with a natural thing, or skill.
[0006] Without repeating adjustment of the image-processing conditions by the test print and the check of a monitor in reproduction of the digital image data acquired with the digital camera in view of the above-mentioned problem, this invention searches for the optimal image-processing conditions early and simply, and aims at offering the image reconstruction method that a customer can be quickly provided with a print [high definition by this], equipment, and the digital camera used for the method.
[0007]
[Means for Solving the Problem] The image reconstruction method of this invention obtains the digital image data to which the aforementioned photography information was given with the digital camera which has the function which gives the photography information showing photography conditions to the digital image data acquired by photography. The digital image data with which the aforementioned photography information was given are memorized to a predetermined storage. It is characterized by performing the image processing for raising the quality of image of the

aforementioned digital image data to the digital image data memorized by the aforementioned storage using the aforementioned photography information given to these digital image data, and reproducing the digital image data by which the image processing was carried out [aforementioned].

[0008] Both information which differs from "the photography information showing photography conditions" for every one photography by operation of photography environment and a photography person here like information peculiar to a camera like the gamma characteristics (input quantity of light pair output ratio) of a camera or a lens focal distance, a focal distance and an exposure value, the kind (color temperature) of lighting, and stroboscope use existence shall be included. The information (it is peculiar to a camera) on former is not unconditionally given as photography information, and a photography person cannot change the information. On the other hand, the information on latter can be intentionally determined, when a photography person performs a certain operation.

[0009] Moreover," which expresses photography conditions to the digital image data acquired by "photography and which carries out photography information grant is defining the file format which consists of image data and photography information, and memorizing image data in an internal memory or card memory of a camera etc. as a file of such a format with photography information.

[0010] In addition, the above "a predetermined storage" means the hard disk connected to the picture server or personal computer of language laboratory system of others and a photograph which is the above-mentioned internal memory attached to a camera etc. here. In this case, a card reader, cable splicing, etc. can perform the copy of the image data from the memory attached to a camera to such a mass storage medium.

[0011] Moreover, "the image processing for raising the quality of image of the aforementioned digital image data" is performing the operation based on a predetermined algorithm according to the given conditions etc., for example, means asking for the look-up table for performing amendment of gradation or a color etc. In this case, by the operation for asking for as optimal the table as "performing the image processing for raising the quality of image of the aforementioned digital image data using the aforementioned photography information", I hear that photography information is used and it is.

[0012] Furthermore, after performing the aforementioned image processing by the image reconstruction method of this invention, the image processing for raising the quality of image of the aforementioned digital image data using the aforementioned processing conditions which gave the various processing conditions of this image processing to the aforementioned digital image data, and were given to these digital image data to the digital image data which memorized to the aforementioned storage and were memorized by the aforementioned storage may perform, and the digital image data by which the image processing was carried out [aforementioned] may reproduce.

[0013] In amendment of for example, the above-mentioned gradation "gives the various processing conditions of an image processing to the aforementioned digital image data" here, or a color, it means giving the look-up table (LUT) called for according to an operation to digital image data etc. Since what is necessary is just to change digital image data by the look-up table by this, without calculating in "performing the image processing" for raising the quality of image of digital image data, the amount of operations can be reduced.

[0014] The picture reproducer of this invention is equipment used for the above-mentioned image reconstruction method, and it is characterized by having an image-processing means to perform the image processing for raising the quality of image of the aforementioned digital image data using the photography information given to the aforementioned digital image data, and a reproduction means to reproduce the digital image data processed by this image-processing means. Under the present circumstances, an "image-processing means" may perform the image processing for raising the quality of image of the aforementioned digital image data using the processing conditions of the aforementioned image processing given to the aforementioned digital image data instead of the aforementioned photography information.

[0015] In addition, the digital camera for acquiring the digital image data reproduced by the image reconstruction method of this invention has a photography information grant means to give the aforementioned photography information to the digital image data obtained by photography.

[0016]

[Effect of the Invention] Since they were made to perform the image processing for giving the photography information showing photography conditions to the digital image data acquired with the digital camera, and raising quality of image using the photography information at the time of reproduction at the time of photography, the image processing for reproduction in consideration of photography conditions can do the image reconstruction method of this invention, and equipment, and they can obtain the print of the optimal result easily, without repeating a test print.

[0017] Furthermore, since it is made to give the optimal image-processing conditions asked not only for a digital camera side but for the picture-reproducer side according to an operation etc. to the image data, about the image data asked for image-processing conditions at once, spending time for an operation is lost that what is necessary is just to

refer to the information after it.
[0018]
[Embodiments of the Invention] Hereafter, the gestalt of 1 operation of this invention is explained with reference to a drawing. Drawing 1 is drawing showing the gestalt of 1 operation of this invention, and the outline of the language laboratory system which reproduces as a print etc. the image data acquired with the digital camera is shown.
[0019] The digital camera 1 has the image pck-up sections 4, such as optical system for taking a photograph, and the air entrainment section 5 for performing automatic exposure processing like the conventional digital camera. Here, although functions, such as an autofocus function, shall also be included in the image pck-up section 4, the existence of such a function shall differ from the level of a function for every model.
[0020] The digital camera 1 of this invention is characterized by having the photography information grant section 6 further in addition to this. Although the photography information grant section 6 gives various photography information to the digital image data acquired by photography, if it considers as the information given here, there is the following.
[0021] First, the gamma characteristics which express the ratio of the output voltage to the input quantity of light of a camera as information peculiar to a camera are mentioned. gamma characteristics -- the contrast of a photograph -- influencing -- high -- with a price camera and the camera of a popular edition, the gamma characteristics differ in many cases In addition, as photography information peculiar to a camera, there are a lens focal distance, an F value of a lens, etc., for example.
[0022] Moreover, it is desirable to also give the content of the air entrainment performed by the camera side as photography information. As air entrainment currently generally performed, average processing, peak value processing, multi-pattern processing, etc. are known, for example. In this case, as photography information, the information which processing was performed among such processings, or the parameter used in the processing shall be given. It is desirable to also give the exposure value which shows a photographic subject's luminosity itself similarly as photography information.
[0023] However, exposure is not automatic, and when performed by the manual, it is good to give the various set points set up by the manual as photography information. An intention of if you want to make it a sharp photograph, if you want to make it soft sensibility, the photography person who said will be reflected in photography information, and can perform the image processing which respected the intention of a photography person at the time of a print. [*if you want to make it the photograph of a bright atmosphere thereby for example,*] [*if you want to make it the photograph* of a dark atmosphere,]
[0024] Moreover, it is not as the set points, such as exposure, and there are some digital cameras which can specify an intention of a photography person by more ambiguous expression. For example, in making the setting sun into a background and photoing it, in case it photos setting sun mode and a person, mode setting is made like a portrait mode and there is a camera with which exposure etc. is automatically set up based on the set-up mode. Also as for such mode information, in the case of such a camera, giving a digital camera as photography information is good. About the photograph which he wants for this to finish for example, with the photography person like the setting sun, setting sun finishing can be given in an image processing, and the print of the setting sun as a photography person's image can be offered. About a photograph to take out the complexion (color of the skin) of scenery finishing and a person finely about a photograph to take out snow finishing and scenery-likeness about a photograph to take out snowy texture similarly, a photograph is reproducible as an intention of a photography person by performing the optimal image processing like monochrome finishing based on photography information, respectively about a photograph making into portrait finishing and a black-and-white picture.
[0025] Or since there are some users who desire to add no amendment processing in a service store conversely, specification which shows that amendment is unnecessary as a function of a camera that it does not amend may be able to be performed. In this case, what is necessary is just to include specification no amending [this] in photography information.
[0026] Furthermore, with a highly efficient camera, when trimming specification can be performed as a function of a camera, it thinks. in such a case, what is necessary is to include only the rough information (for example, the trimming of one person in a photograph or two persons' trimming -- ** -- the said specification) specified by the function of a camera in photography information, and just to carry out as it entrusts with the task of a service store about fine range specification
[0027] Furthermore, since a focal distance, a focal position, etc. serve as important information in the case of an image processing, giving as photography information is good. If the information about a focus is given as photography information, since a focus can judge that main photographic subjects are in the doubled portion, it becomes unnecessary for example, to perform complicated extraction processing, although extraction processing of main

photographic subjects may be performed especially in the image processing at the time of a print in order to raise main photographic subjects' quality of image.

[0028] Moreover, in order to make the kind and strength of an ambient light at the time of photography reflect in an image processing, it is desirable to give the weather at the time of photography etc. as photography information in the lighting conditions acquired by the color temperature sensor, the exposure meter, etc., stroboscope use existence, and outdoor photography.

[0029] In addition, it is also possible to, give information, such as for example, a photography date, and photography time or a theme title of a photograph, to image data as a kind of photography information in addition to this.

[0030] After it acquires the photography information grant section 6 by receiving data if needed from the image pck-up section 4 or the air entrainment section 5 about the photography conditions which change the above photography information for every photography by setup at the time of shipment about a value peculiar to a camera again and it assembles it to a predetermined data format, it is given to image data. In case image data is acquired and an internal memory or card memory specifically memorizes, the image data 8 is memorized as one image file 7 by the photography information 9 and the set.

[0031] The digital image data memorized by memory in the digital camera are memorized by the picture server 2 through a card reader or a cable. The copy method of the data to the picture server 2 can use all the data copy methods usually used including the network etc. here.

[0032] On the other hand, the picture reproducer 3 in the gestalt of this operation regenerates the image file 7 accumulated at the above-mentioned picture server 2 one by one, and consists of a display interface 13 for displaying the setup processing section 11 which performs the image processing for raising quality of image to the image data of each image file 7, and the set-up image data on the printer 12 for outputting as a print 14, or a monitor 15 etc. Among these, in the setup processing section 11, it is directly used for an operation or the above-mentioned photography information 9 is used for the judgment of whether to perform predetermined processing.

[0033] Here, although the setup processing section 11 calculates according to a predetermined algorithm based on the photography information 9 and performs an image processing in quest of the optimal image-processing conditions, it may give the processing conditions 10 of an image processing further to image data 8 in this case. Thereby, when printing for an extra copy of a photograph etc., it becomes unnecessary to calculate again and saving of time and cost can be aimed at. Moreover, since higher quality of image is required compared with a value monitor, once it memorizes the print in quest of image-processing conditions according to the print, when carrying out the value monitor of the image data henceforth, it can display a high definition picture in a short time using the information.

[0034] As mentioned above, although language laboratory system was explained to the example since high definition was required especially in the print, this invention can be applied when appreciating a picture with a personal computer. That is, it becomes possible to display a high definition photograph on a monitor by performing the image processing which used the photography information 9 in the personal computer like the above-mentioned language laboratory system.

[Translation done.]

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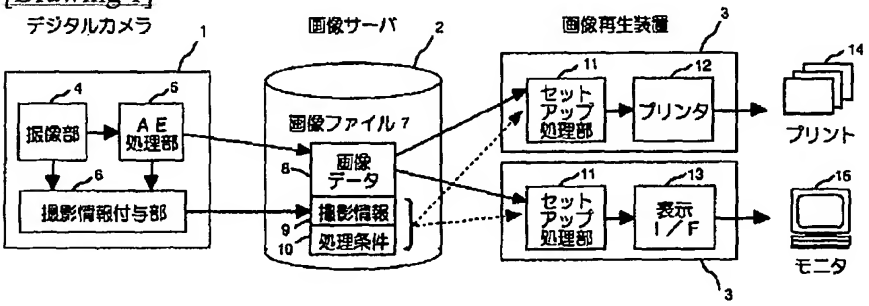
DRAWINGS

[Drawing 1]



[Translation done.]

* NOTICES *

CORRECTION or AMENDMENT

[Official Gazette Type] Printing of amendment by the convention of 2 of Article 17 of patent law.
[Section partition] The 3rd partition of the 7th section.
[Date of issue] April 12, Heisei 14 (2002. 4.12)

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H04N     5/91                    .
1/23                    .
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5/765                   .
5/781                   .
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[FI]

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H04N     5/91           J            .
1/23                    .
5/225          F          .
5/781      510 L          .
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[Procedure revision]
[Filing Date] December 21, Heisei 13 (2001. 12.21)
[Procedure amendment 1]
[Document to be Amended] Specification.
[Item(s) to be Amended] Whole sentence.
[Method of Amendment] Change.
[Proposed Amendment]
[Document Name] Specification.
[Title of the Invention] The digital camera used for the image reconstruction method which reproduces the digital image data acquired with the digital camera, equipment, and its method.
[Claim(s)]
[Claim 1] The digital image data to which the aforementioned photography information was given with the digital camera which has the function which gives photography information to the digital image data acquired by photography are obtained.
The digital image data with which the aforementioned photography information was given are memorized to a predetermined storage.
The image processing for raising the quality of image of the aforementioned digital image data to the digital image data memorized by the aforementioned storage using the aforementioned photography information given to these digital image data is performed.
The image reconstruction method characterized by reproducing the digital image data by which the image processing was carried out [aforementioned].
[Claim 2] The image reconstruction method according to claim 1 characterized by the aforementioned photography

information including the specification [that it does not amend] information which shows that the mode information and the aforementioned image processing which make an intention of a photography person reflect in the aforementioned image processing are unnecessary.
[Claim 3] After performing the aforementioned image processing, the various processing conditions of this image processing are given to the aforementioned digital image data, and it memorizes to the aforementioned storage.
The image processing for raising the quality of image of the aforementioned digital image data to the digital image data memorized by the aforementioned storage using the aforementioned processing conditions given to these digital image data is performed.
The image reconstruction method according to claim 1 or 2 characterized by reproducing the digital image data by which the image processing was carried out [aforementioned].
[Claim 4] It is the picture reproducer used for the method of claims 1 or 2.
An image-processing means to perform the image processing for raising the quality of image of the aforementioned digital image data using the photography information given to the aforementioned digital image data,
The picture reproducer characterized by having a reproduction means to reproduce the digital image data processed by this image-processing means.
[Claim 5] It is the picture reproducer used for the method of a claim 3.
An image-processing means to perform the image processing for raising the quality of image of the aforementioned digital image data using the processing conditions of the aforementioned image processing given to the aforementioned digital image data,
The picture reproducer characterized by having a reproduction means to reproduce the digital image data processed by this image-processing means.
[Claim 6] It is the digital camera used for the method of claims 1, 2, or 3.
The digital camera characterized by having a photography information grant means to give the aforementioned photography information to the aforementioned digital image data.
[Claim 7] The digital image data to which the aforementioned photography information was given with the digital camera which has the function which gives photography information to the digital image data acquired by photography are obtained.
The digital image data with which the aforementioned photography information was given are memorized to a predetermined storage.
The image-processing method characterized by performing the image processing for raising the quality of image of the aforementioned digital image data to the digital image data memorized by the aforementioned storage using the aforementioned photography information given to these digital image data.
[Claim 8] The image-processing method according to claim 1 characterized by the aforementioned photography information including the specification [that it does not amend] information which shows that the mode information and the aforementioned image processing which make an intention of a photography person reflect in the aforementioned image processing are unnecessary.
[Claim 9] After performing the aforementioned image processing, the various processing conditions of this image processing are given to the aforementioned digital image data, and it memorizes to the aforementioned storage.
The image-processing method according to claim 7 or 8 characterized by performing the image processing for raising the quality of image of the aforementioned digital image data to the digital image data memorized by the aforementioned storage using the aforementioned processing conditions given to these digital image data.
[Claim 10] It is the image processing system used for the method of claims 7 or 8.
The image processing system characterized by having an image-processing means to perform the image processing for raising the quality of image of the aforementioned digital image data using the photography information given to the aforementioned digital image data.
[Claim 11] The image processing system characterized by having an image-processing means to perform the image processing for raising the quality of image of the aforementioned digital image data using the processing conditions of the aforementioned image processing which is the image processing system used for the method of a claim 9, and was given to the aforementioned digital image data.
[Claim 12] It is the digital camera used for the method of claims 7, 9, or 9.
The digital camera characterized by having a photography information grant means to give the aforementioned photography information to the aforementioned digital image data.
[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] this invention relates to the image reconstruction method for

reproducing the digital image data acquired with the digital camera on a printer or a monitor, equipment, and the digital camera that uses it for the method.

[0002]

[Description of the Prior Art] Generally the quality of image of a photograph, especially a result of color photography change a lot according to exposure conditions. Therefore, AE mechanism for setting up proper light exposure corresponding to the luminosity at the time of photography or a photographic subject's luminance distribution is carried in the camera. However, since there is a limitation also in AE mechanism and the performance has a difference with a camera, an always good photograph cannot necessarily be taken.

[0003] For this reason, in the photograph store, in case it prints so that a customer can be provided with the high definition possible photoprint, exposure conditions were adjusted and amendment processing has been performed for the excess and deficiency of exposure, or the bias of a color. In this case, the image processing which should be performed with the photograph processed with a natural thing is because of differing. Creating the print with which searches for the optimal image-processing conditions, performs an image processing according to the image-processing condition searched for, and a customer is finally provided is performed by repeating and performing adjustment of image-processing conditions, or creating the test print of many sheets and checking the result condition, judging the delicate difference in the picture displayed on the monitor based on experience.

[0004] In the case of the electronic camera (henceforth a digital camera) using the electronic image pck-up element, not much advanced processing cannot be performed in many cases in a camera side from restrictions of cost or the operation time. A thing not much highly efficient as an AE mechanism may not be carried noting that it is enough as quality of image if it is pictures to which the comparatively large monitor display image of quality-of-image tolerance can be equal to observation, such as a picture displayed on the liquid crystal display monitor attached to a CRT monitor or a camera, in order to use the picture acquired without minding a photograph store in the case of a digital camera in many cases as it is. For this reason, in reproducing the digital image data photoed with the digital camera as a print, it is not easy to obtain the result optimal as a narrow print picture of quality-of-image tolerance, and work time-consuming [, such as a repeat of the above test prints,] is needed.

[0005]

[Problem(s) to be Solved by the Invention] However, it not only takes time, but the amendment by the above trial and error requires the cost for a test print. Moreover, there is also a problem that a difference arises in a result with experience of the operator who adjusts with a natural thing, or skill.

[0006] Without repeating adjustment of the image-processing conditions by the test print and the check of a monitor in reproduction of the digital image data acquired with the digital camera in view of the above-mentioned problem, this invention searches for the optimal image-processing conditions early and simply, and aims at offering the image reconstruction method that a customer can be quickly provided with a print [high definition by this], equipment, and the digital camera used for the method.

[0007]

[Means for Solving the Problem] The image reconstruction method of this invention obtains the digital image data to which the aforementioned photography information was given with the digital camera which has the function which gives photography information to the digital image data acquired by photography. The digital image data with which the aforementioned photography information was given are memorized to a predetermined storage. It is characterized by performing the image processing for raising the quality of image of the aforementioned digital image data to the digital image data memorized by the aforementioned storage using the aforementioned photography information given to these digital image data, and reproducing the digital image data by which the image processing was carried out [aforementioned].

[0008] Both information which differs from "photography information" for every one photography by operation of photography environment and a photography person here like information peculiar to a camera like the gamma characteristics (input quantity of light pair output ratio) of a camera or a lens focal distance, a focal distance and an exposure value, the kind (color temperature) of lighting, and stroboscope use existence shall be included. The information (it is peculiar to a camera) on former is not unconditionally given as photography information, and a photography person cannot change the information. On the other hand, the information on latter can be intentionally determined, when a photography person performs a certain operation.

[0009] Moreover, it is not as the set points, such as exposure, and there are some digital cameras which can specify an intention of a photography person by more ambiguous expression. For example, in making the setting sun into a background and photoing it, in case it photos setting sun mode and a person, mode setting is made like a portrait mode and there is a camera with which exposure etc. is automatically set up based on the set-up mode. Also as for such mode information, in the case of such a camera, it is good to give digital image data as photography information. About the

photograph which he wants for this to finish for example, with the photography person like the setting sun, setting sun finishing can be given in an image processing, and the print of the setting sun as a photography person's image can be offered. About a photograph to take out the complexion (color of the skin) of scenery finishing and a person finely about a photograph to take out snow finishing and scenery-likeness about a photograph to take out snowy texture similarly, a photograph is reproducible as an intention of a photography person by performing the optimal image processing like monochrome finishing based on photography information, respectively about a photograph making into portrait finishing and a black-and-white picture.

[0010] Or since there are some users who desire to add no image processing to digital image data conversely, specification which shows that an image processing is unnecessary as a function of a camera that it does not amend may be able to be performed. In this case, what is necessary is just to include the information which specifies no amending [this] in photography information.

[0011] Moreover, it is defining the file format which consists of image data "which gives photography information to the digital image data acquired by photography", and photography information, and memorizing image data in an internal memory or card memory of a camera etc. as a file of such a format with photography information.

[0012] In addition, the above "a predetermined storage" means the hard disk connected to the picture server or personal computer of language laboratory system of others and a photograph which is the above-mentioned internal memory attached to a camera etc. here. In this case, a card reader, cable splicing, etc. can perform the copy of the image data from the memory attached to a camera to such a mass storage medium.

[0013] Moreover, "the image processing for raising the quality of image of the aforementioned digital image data" is performing the operation based on a predetermined algorithm according to the given conditions etc., for example, means asking for the look-up table for performing amendment of gradation or a color etc. In this case, by the operation for asking for as optimal the table as "performing the image processing for raising the quality of image of the aforementioned digital image data using the aforementioned photography information", I hear that photography information is used and it is.

[0014] Furthermore, after performing the aforementioned image processing by the image reconstruction method of this invention, the image processing for raising the quality of image of the aforementioned digital image data using the aforementioned processing conditions which gave the various processing conditions of this image processing to the aforementioned digital image data, and were given to these digital image data to the digital image data which memorized to the aforementioned storage and were memorized by the aforementioned storage may perform, and the digital image data by which the image processing was carried out [aforementioned] may reproduce.

[0015] In amendment of for example, the above-mentioned gradation "gives the various processing conditions of an image processing to the aforementioned digital image data" here, or a color, it means giving the look-up table (LUT) called for according to an operation to digital image data etc. Since what is necessary is just to change digital image data by the look-up table by this, without calculating in "performing the image processing" for raising the quality of image of digital image data, the amount of operations can be reduced.

[0016] The picture reproducer of this invention is equipment used for the above-mentioned image reconstruction method, and it is characterized by having an image-processing means to perform the image processing for raising the quality of image of the aforementioned digital image data using the photography information given to the aforementioned digital image data, and a reproduction means to reproduce the digital image data processed by this image-processing means. Under the present circumstances, an "image-processing means" may perform the image processing for raising the quality of image of the aforementioned digital image data using the processing conditions of the aforementioned image processing given to the aforementioned digital image data instead of the aforementioned photography information.

[0017] In addition, the digital camera for acquiring the digital image data reproduced by the image reconstruction method of this invention has a photography information grant means to give the aforementioned photography information to the digital image data obtained by photography.

[0018] The image-processing method by this invention obtains the digital image data to which the aforementioned photography information was given with the digital camera which has the function which gives photography information to the digital image data acquired by photography. The digital image data with which the aforementioned photography information was given are memorized to a predetermined storage. It is characterized by performing the image processing for raising the quality of image of the aforementioned digital image data to the digital image data memorized by the aforementioned storage using the aforementioned photography information given to these digital image data.

[0019] In addition, it is desirable to include the specification [that it does not amend] information which shows that the mode information and the aforementioned image processing which make an intention of a photography person

reflect in the aforementioned image processing are unnecessary as the aforementioned photography information.
[0020] Moreover, in the image-processing method of this invention, after performing the aforementioned image processing, you may be made to perform the image processing for raising the quality of image of the aforementioned digital image data using the aforementioned processing conditions which gave the various processing conditions of this image processing to the aforementioned digital image data, and were given to these digital image data to the digital image data which memorized to the aforementioned storage and were memorized by the aforementioned storage.
[0021] The image processing system of this invention is equipment used for the above-mentioned image-processing method, and it is characterized by having an image-processing means to perform the image processing for raising the quality of image of the aforementioned digital image data using the photography information given to the aforementioned digital image data. Under the present circumstances, an "image-processing means" may perform the image processing for raising the quality of image of the aforementioned digital image data using the processing conditions of the aforementioned image processing given to the aforementioned digital image data instead of the aforementioned photography information.
[0022] In addition, the digital camera for acquiring the digital image data processed by the image-processing method of this invention has a photography information grant means to give the aforementioned photography information to the digital image data obtained by photography.
[0023]
[Effect of the Invention] Since they were made to perform the image processing for giving the photography information showing photography conditions to the digital image data acquired with the digital camera, and raising quality of image using the photography information at the time of reproduction at the time of photography, the image processing for reproduction in consideration of photography conditions can do the image reconstruction method of this invention, and equipment, and they can obtain the print of the optimal result easily, without repeating a test print.
[0024] Furthermore, since it is made to give the optimal image-processing conditions asked not only for a digital camera side but for the picture-reproducer side according to an operation etc. to the image data, about the image data asked for image-processing conditions at once, spending time for an operation is lost that what is necessary is just to refer to the information after it.
[0025]
[Embodiments of the Invention] Hereafter, the form of 1 operation of this invention is explained with reference to a drawing. Drawing 1 is drawing showing the form of 1 operation of this invention, and the outline of the language laboratory system which reproduces as a print etc. the image data acquired with the digital camera is shown.
.
[0026] The digital camera 1 has the image pck-up sections 4, such as optical system for taking a photograph, and the air entrainment section 5 for performing automatic exposure processing like the conventional digital camera. Here, although functions, such as an autofocus function, shall also be included in the image pck-up section 4, the existence of such a function shall differ from the level of a function for every model.
[0027] The digital camera 1 of this invention is characterized by having the photography information grant section 6 further in addition to this. Although the photography information grant section 6 gives various photography information to the digital image data acquired by photography, if it considers as the information given here, there is the following.
[0028] First, the gamma characteristics which express the ratio of the output voltage to the input quantity of light of a camera as information peculiar to a camera are mentioned. gamma characteristics -- the contrast of a photograph -- influencing -- high -- with a price camera and the camera of a popular edition, the gamma characteristics differ in many cases In addition, as photography information peculiar to a camera, there are a lens focal distance, an F value of a lens, etc., for example.
[0029] Moreover, it is desirable to also give the contents of the air entrainment performed by the camera side as photography information. As air entrainment currently generally performed, average processing, peak value processing, multi-pattern processing, etc. are known, for example. In this case, as photography information, the information which processing was performed among such processings, or the parameter used in the processing shall be given. It is desirable to also give the exposure value which shows a photographic subject's luminosity itself similarly as photography information.
[0030] However, exposure is not automatic, and when performed by the manual, it is good to give the various set points set up by the manual as photography information. An intention of if you want to make it a sharp photograph, if you want to make it soft sensibility, the photography person who said will be reflected in photography information, and can perform the image processing which respected the intention of a photography person at the time of a print. [if you want to make it the photograph of a bright atmosphere thereby for example,] [if you want to make it the photograph of a dark atmosphere,]

[0031] Moreover, it is not as the set points, such as exposure, and there are some digital cameras which can specify an intention of a photography person by more ambiguous expression. For example, in making the setting sun into a background and photoing it, in case it photos setting sun mode and a person, mode setting is made like a portrait mode and there is a camera with which exposure etc. is automatically set up based on the set-up mode. Also as for such mode information, in the case of such a camera, giving a digital camera as photography information is good. About the photograph which he wants for this to finish for example, with the photography person like the setting sun, setting sun finishing can be given in an image processing, and the print of the setting sun as a photography person's image can be offered. About a photograph to take out the complexion (color of the skin) of scenery finishing and a person finely about a photograph to take out snow finishing and scenery-likeness about a photograph to take out snowy texture similarly, a photograph is reproducible as an intention of a photography person by performing the optimal image processing like monochrome finishing based on photography information, respectively about a photograph making into portrait finishing and a black-and-white picture.

[0032] Or since there are some users who desire to add no amendment processing in a service store conversely, specification which shows that amendment is unnecessary as a function of a camera that it does not amend may be able to be performed. In this case, what is necessary is just to include specification no amending [this] in photography information.

[0033] Furthermore, with a highly efficient camera, when trimming specification can be performed as a function of a camera, it thinks. in such a case, what is necessary is to include only the rough information (for example, the trimming of one person in a photograph or two persons' trimming -- ** -- the said specification) specified by the function of a camera in photography information, and just to carry out as it entrusts with the task of a service store about fine range specification

[0034] Furthermore, since a focal distance, a focal position, etc. serve as important information in the case of an image processing, giving as photography information is good. If the information about a focus is given as photography information, since a focus can judge that main photographic subjects are in the doubled portion, it becomes unnecessary for example, to perform complicated extraction processing, although extraction processing of main photographic subjects may be performed especially in the image processing at the time of a print in order to raise main photographic subjects' quality of image.

[0035] Moreover, in order to make the kind and strength of an ambient light at the time of photography reflect in an image processing, it is desirable to give the weather at the time of photography etc. as photography information in the lighting conditions acquired by the color temperature sensor, the exposure meter, etc., stroboscope use existence, and outdoor photography.

[0036] In addition, it is also possible to, give information, such as for example, a photography date, and photography time or a theme title of a photograph, to image data as a kind of photography information in addition to this.

[0037] After it acquires the photography information grant section 6 by receiving data if needed from the image pck-up section 4 or the air entrainment section 5 about the photography conditions which change the above photography information for every photography by setup at the time of shipment about a value peculiar to a camera again and it assembles it to a predetermined data format, it is given to image data. In case image data is acquired and an internal memory or card memory specifically memorizes, the image data 8 is memorized as one image file 7 by the photography information 9 and the set.

[0038] The digital image data memorized by memory in the digital camera are memorized by the picture server 2 through a card reader or a cable. The copy method of the data to the picture server 2 can use all the data copy methods usually used including the network etc. here.

[0039] On the other hand, the picture reproducer 3 in the form of this operation regenerates the image file 7 accumulated at the above-mentioned picture server 2 one by one, and consists of a display interface 13 for displaying the setup processing section 11 which performs the image processing for raising quality of image to the image data of each image file 7, and the set-up image data on the printer 12 for outputting as a print 14, or a monitor 15 etc. Among these, in the setup processing section 11, it is directly used for an operation or the above-mentioned photography information 9 is used for the judgment of whether to perform predetermined processing.

[0040] Here, although the setup processing section 11 calculates according to a predetermined algorithm based on the photography information 9 and performs an image processing in quest of the optimal image-processing conditions, it may give the processing conditions 10 of an image processing further to image data 8 in this case. Thereby, when printing for an extra copy of a photograph etc., it becomes unnecessary to calculate again and saving of time and cost can be aimed at. Moreover, since higher quality of image is required compared with a value monitor, once it memorizes the print in quest of image-processing conditions according to the print, when carrying out the value monitor of the image data henceforth, it can display a high definition picture in a short time using the information.

[0041] As mentioned above, although language laboratory system was explained to the example since high definition was required especially in the print, this invention can be applied when appreciating a picture with a personal computer. That is, it becomes possible to display a high definition photograph on a monitor by performing the image processing which used the photography information 9 in the personal computer like the above-mentioned language laboratory system.

[Brief Description of the Drawings]

[Drawing 1] Drawing showing the form of 1 operation of this invention.

[Description of Notations]

1 Digital camera.
2 Picture server.
3 Picture reproducer.
4 Image pck-up section.
5 Air entrainment section.
6 Photography information grant section.
7 Image file.
8 Image data.
9 Photography information.
10 Processing conditions.
11 Setup processing section.
12 Printer.
13 Display interface.
14 Print.
15 Monitor.

[Translation done.]

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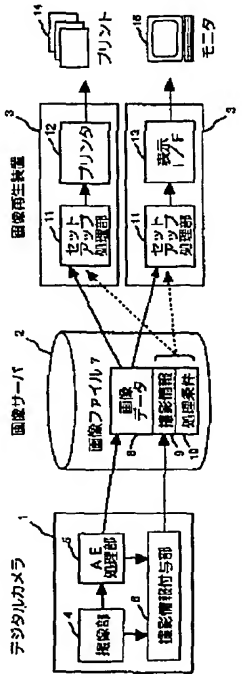
最終頁に続く

(54)【発明の名称】　デジタルカメラにより取得されたデジタル画像データを再生する画像再生方法及び装置並びにその方法に使用するデジタルカメラ

(57)【要約】

【課題】　デジタルカメラにより撮影された写真画像を再生する際に、画質を高めるためのテストプリントあるいはモニタの確認による微調整を繰り返すことなく、直ちに高画質な写真画像を再生する。

【解決手段】　撮影により取得したデジタル画像データ８に撮影条件を表す撮影情報９を付与する機能（撮影情報付与部６）を有するデジタルカメラ１により撮影を行う。この撮影により得られた画像データ８に対し、画像再生装置３はセットアップ処理部11において、画像データ８に付与された撮影情報９を使用して画質を高めるための画像処理を行ってからその画像データをプリント14としてあるいはモニタ15の表示画像として再生する。



【特許請求の範囲】
【請求項１】　撮影により取得したデジタル画像データに撮影条件を表す撮影情報を付与する機能を有するデジタルカメラにより前記撮影情報が付与されたデジタル画像データを得、
前記撮影情報が付与されたデジタル画像データを所定の記憶媒体に記憶し、
前記記憶媒体に記憶されたデジタル画像データに対し、該デジタル画像データに付与された前記撮影情報を使用して前記デジタル画像データの画質を高めるための画像処理を行い、
前記画像処理されたデジタル画像データを再生することを特徴とする画像再生方法。
【請求項２】　前記画像処理を行った後、該画像処理の各種処理条件を前記デジタル画像データに付与して前記記憶媒体に記憶し、
前記記憶媒体に記憶されたデジタル画像データに対し、該デジタル画像データに付与された前記処理条件を使用して前記デジタル画像データの画質を高めるための画像処理を行い、
前記画像処理されたデジタル画像データを再生することを特徴とする請求項１記載の画像再生方法。
【請求項３】　請求項１の方法に使用する画像再生装置であって、
前記デジタル画像データに付与された撮影情報を使用して前記デジタル画像データの画質を高めるための画像処理を行う画像処理手段と、
該画像処理手段により処理されたデジタル画像データを再生する再生手段とを有することを特徴とする画像再生装置。
【請求項４】　請求項２の方法に使用する画像再生装置であって、
前記デジタル画像データに付与された前記画像処理の処理条件を使用して前記デジタル画像データの画質を高めるための画像処理を行う画像処理手段と、
該画像処理手段により処理されたデジタル画像データを再生する再生手段とを有することを特徴とする画像再生装置。
【請求項５】　請求項１または２の方法に使用するデジタルカメラであって、
前記撮影情報を前記デジタル画像データに付与する撮影情報付与手段を有することを特徴とするデジタルカメラ。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明はデジタルカメラにより取得されたデジタル画像データをプリンタやモニタ上で再生するための画像再生方法および装置、並びにその方法に使用するデジタルカメラに関するものである。
【０００２】
【従来の技術】一般に写真の画質、特にカラー写真の仕上がりは、露出条件によって大きく変わるものである。したがってカメラには、撮影時の明るさや被写体の輝度分布に対応して適正な露光量を設定するためのＡＥ機構が搭載されている。しかし、ＡＥ機構にも限界があり、またその性能はカメラによって差があるため、常に良好な写真が撮影できるとは限らない。
【０００３】このため、写真店などでは、顧客にできる限り高画質な写真プリントを提供できるように、プリントする際に露光条件を調整して露出の過不足や色の偏りを補正する処理を施している。この場合、当然のことながら処理する写真によって行うべき画像処理は異なるため、モニタに表示された画像の微妙な違いを経験に基づいて判断しながら画像処理条件の調整を繰り返し行ったり、何枚ものテストプリントを作成してその仕上がり具合を確認したりすることによって最適な画像処理条件を求め、その求められた画像処理条件によって画像処理を施して最終的に顧客に提供するプリントを作成することが行われている。
【０００４】電子撮像素子を用いた電子カメラ（以下デジタルカメラという）の場合には、コストや演算時間の制約からカメラ側であまり高度な処理をできないことが多い。デジタルカメラの場合には写真店を介さずに取得された画像をそのまま利用することも多いため、ＣＲＴモニタあるいはカメラに付属する液晶モニタに表示される画像など、画質許容度の比較的広いモニタ表示画像が観察に耐えうる画像であれば画質として十分であるとして、ＡＥ機構としてあまり高性能なものが搭載されない場合もある。このため、プリントとしてデジタルカメラで撮影されたデジタル画像データを再生する場合には、画質許容度の狭いプリント画像として最適な仕上がりを得るのは容易ではなく、前述のようなテストプリントの繰り返しなど手間のかかる作業が必要となる。
【０００５】
【発明が解決しようとする課題】しかしながら、上記のような試行錯誤による補正は時間がかかるばかりでなく、テストプリントのためのコストもかかる。また当然のことながら、調整を行うオペレータの経験や技能によって仕上がりに差が生じるという問題もある。
【０００６】本発明は、上記問題に鑑みて、デジタルカメラで取得したデジタル画像データの再生において、テストプリントや、モニタの確認による画像処理条件の調整を繰り返すことなく、早くかつ簡単に最適な画像処理条件を求め、これにより高画質なプリントを迅速に顧客に提供できる画像再生方法および装置、並びにその方法に使用するデジタルカメラを提供することを目的とするものである。
【０００７】
【課題を解決するための手段】本発明の画像再生方法は、撮影により取得したデジタル画像データに撮影条件

を表す撮影情報を付与する機能を有するデジタルカメラにより前記撮影情報が付与されたデジタル画像データを得、前記撮影情報が付与されたデジタル画像データを所定の記憶媒体に記憶し、前記記憶媒体に記憶されたデジタル画像データに対し、該デジタル画像データに付与された前記撮影情報を使用して前記デジタル画像データの画質を高めるための画像処理を行い、前記画像処理されたデジタル画像データを再生することを特徴とするものである。

【０００８】ここで「撮影条件を表す撮影情報」とは、例えばカメラのγ特性（入力光量対出力電圧比）やレンズ焦点距離のようなカメラ固有の情報と、フォーカス距離、ＥＶ値、照明の種類（色温度）、ストロボ使用有無のように撮影環境や撮影者の操作によって１回の撮影毎に異なる情報の両方を含むものとする。前者の（カメラ固有の）情報は無条件に撮影情報として付与されるものであり、撮影者はその情報を変更することはできない。一方、後者の情報は撮影者が何らかの操作を行うことにより意図的に決定することができるものである。

【０００９】また「撮影により取得したデジタル画像データに撮影条件を表す撮影情報付与する」とは、画像データと撮影情報とからなるファイルフォーマットを定め、画像データを撮影情報とともにそのようなフォーマットのファイルとして、例えばカメラの内蔵メモリあるいはカードメモリなどに記憶することである。

【００１０】なお、ここで前記「所定の記憶媒体」は、カメラに付属する上記内蔵メモリなどの他、写真のラボシステムの画像サーバあるいはパソコンに接続されるハードディスクなどを意味する。この場合カメラに付属するメモリからそのような大容量記憶媒体への画像データの複写はカードリーダやケーブル接続などにより行うことができる。

【００１１】また、「前記デジタル画像データの画質を高めるための画像処理」とは、与えられた条件にしたがって所定のアルゴリズムに基づく演算を行うことなどであり、例えば階調や色の補正を行うためのルックアップテーブルを求めることなどを意味する。この場合、「前記撮影情報を使用して前記デジタル画像データの画質を高めるための画像処理を行う」とは最適なテーブルを求めるための演算で撮影情報を使用するということである。

【００１２】さらに、本発明の画像再生方法では、前記画像処理を行った後に、該画像処理の各種処理条件を前記デジタル画像データに付与して前記記憶媒体に記憶し、前記記憶媒体に記憶されたデジタル画像データに対し、該デジタル画像データに付与された前記処理条件を使用して前記デジタル画像データの画質を高めるための画像処理を行い、前記画像処理されたデジタル画像データを再生してもよい。

【００１３】ここで「画像処理の各種処理条件を前記デジタル画像データに付与する」とは、例えば上記階調や色の補正の場合、演算により求められたルックアップテーブル（ＬＵＴ）をデジタル画像データに付与することなどを意味する。これにより、「デジタル画像データの画質を高めるための画像処理を行う」場合には演算を行わずにそのルックアップテーブルでデジタル画像データを変換すればよいため、演算量を減らすことができる。

【００１４】本発明の画像再生装置は上記画像再生方法に使用する装置であって、前記デジタル画像データに付与された撮影情報を使用して前記デジタル画像データの画質を高めるための画像処理を行う画像処理手段と、該画像処理手段により処理されたデジタル画像データを再生する再生手段とを有することを特徴とするものである。この際「画像処理手段」は、前記撮影情報の代わりに前記デジタル画像データに付与された前記画像処理の処理条件を使用して前記デジタル画像データの画質を高めるための画像処理を行うものであってもよい。

【００１５】なお、本発明の画像再生方法により再生されるデジタル画像データを取得するためのデジタルカメラは、前記撮影情報を撮影により得られたデジタル画像データに付与する撮影情報付与手段を有するものである。

【００１６】

【発明の効果】本発明の画像再生方法および装置は、撮影時に、デジタルカメラにより取得したデジタル画像データに撮影条件を表す撮影情報を付与し、再生時にその撮影情報を使用して画質を高めるための画像処理を行うようにしたので、撮影条件を考慮した再生のための画像処理ができ、テストプリントを繰り返すことなく最適な仕上がりのプリントを容易に得ることができる。

【００１７】さらにデジタルカメラ側のみならず画像再生装置側でも、演算などにより求められた最適な画像処理条件をその画像データに付与するようにしているので、一度画像処理条件が求められた画像データについては、それ以降はその情報を参照するだけでよく、演算のために時間を費やすことがなくなる。

【００１８】

【発明の実施の形態】以下、本発明の一実施の形態について図面を参照して説明する。図１は、本発明の一実施の形態を示す図であり、デジタルカメラにより取得された画像データをプリントなどとして再生するラボシステムの概要が示されている。

【００１９】デジタルカメラ１は従来のデジタルカメラと同様、撮影を行うための光学系などの撮像部４と、自動露出処理を行うためのＡＥ処理部５とを有している。ここで、撮像部４には例えばオートフォーカス機能などの機能も含まれるものとするが、このような機能の有無あるいは機能のレベルは機種毎に異なるものとする。

【００２０】本発明のデジタルカメラ１は、これに加えさらに撮影情報付与部６を有することを特徴とする。撮

影情報付与部６は撮影により取得されたデジタル画像データに種々の撮影情報を付与するものであるが、ここで付与される情報としては例えば以下のようなものがある。

【００２１】まず、カメラ固有の情報として、カメラの入力光量に対する出力電圧の比を表すγ特性が挙げられる。γ特性は写真のコントラストに影響し、高価格なカメラと廉価版のカメラではそのγ特性は異なることが多い。この他、カメラ固有の撮影情報としては、例えばレンズ焦点距離やレンズのＦ値などがある。

【００２２】また、カメラ側で行われたＡＥ処理の内容も撮影情報として付与することが望ましい。一般的に行われているＡＥ処理としては、例えば平均値処理、ピーク値処理、マルチパターン処理などが知られている。この場合撮影情報としては、このような処理のうちどの処理が行われたかという情報、あるいはその処理において用いられたパラメータなどを付与するものとする。同様に被写体の明るさそのものを示すＥＶ値も撮影情報として付与することが望ましい。

【００２３】但し、露出が自動ではなくマニュアルで行われた場合には、マニュアルで設定された各種設定値を撮影情報として付与するのがよい。これにより、例えば明るい雰囲気の写真にしたいとか暗い雰囲気の写真にしたいとか、シャープな写真にしたいとか柔らかい感じにしたいとかいった撮影者の意図が撮影情報に反映されることとなり、プリント時に撮影者の意図を尊重した画像処理を行うことができる。

【００２４】また、デジタルカメラの中には、露出などの設定値としてではなく、より曖昧な表現で撮影者の意図を指定することができるものがある。例えば夕陽を背景にして撮影する場合には夕陽モード、人物を撮影する際にはポートレートモードというようにモード設定ができ、設定されたモードに基づいて自動的に露出などが設定されるカメラなどがある。このようなカメラの場合には、このようなモード情報も撮影情報としてデジタルカメラに付与するのがよい。これにより、例えば撮影者が夕陽らしく仕上げたいと思う写真については、画像処理において夕陽仕上げを施して、撮影者のイメージ通りの夕陽のプリントを提供することができる。同様に、雪の質感を出したい写真については雪仕上げ、風景らしさを出したい写真については風景仕上げ、人物の顔色（肌の色）をきれいに出したい写真についてはポートレート仕上げ、白黒写真にしたい写真については白黒仕上げというように、それぞれ撮影情報に基づいて最適な画像処理を施すことにより、撮影者の意図通りに写真を再生することができる。

【００２５】あるいは、逆に、サービス店において一切補正処理を加えないことを望むユーザもいるため、カメラの機能として、補正が不要であることを示す無補正指定ができる場合もある。この場合には、この無補正という指定を撮影情報に含めればよい。

【００２６】さらに、高機能なカメラでは、カメラの機能としてトリミング指定ができる場合も考えられる。このような場合には、カメラの機能により指定された大まかな情報（例えば写真中の人物１人のトリミングか、あるいは２人のトリミングかといった指定）のみを撮影情報に含め、細かい範囲指定についてはサービス店に一任するというようにすればよい。

【００２７】さらに、フォーカス距離、フォーカス位置なども画像処理の際の重要な情報となるため、撮影情報として付与するのがよい。例えば、プリント時の画像処理では、主要被写体の画質を特に高めるために主要被写体の抽出処理を行うことがあるが、フォーカスに関する情報が撮影情報として付与されていれば、ピントが合わせられた部分に主要被写体があると判断することができるため、複雑な抽出処理を行う必要がなくなる。

【００２８】また、撮影時の周囲光の種類や強さを画像処理に反映させるためには、色温度センサや露出計などにより得られる照明条件、ストロボ使用有無、屋外撮影の場合には撮影時の天候などを撮影情報として付与することが望ましい。

【００２９】なお、この他、例えば撮影年月日や撮影時刻、あるいは写真のテーマタイトルなどの情報を撮影情報の一種として画像データに付与することも可能である。

【００３０】撮影情報付与部６は、上記のような撮影情報を、カメラ固有の値については出荷時の設定により、また撮影毎に変わる撮影条件については必要に応じて撮像部４あるいはＡＥ処理部５からデータを受信することにより取得し、それを所定のデータフォーマットに組み立てた後、画像データに付与する。具体的には、画像データが取得され内蔵メモリあるいはカードメモリなどに記憶される際に、その画像データ８を撮影情報９とセットで１つの画像ファイル７として記憶するようにする。

【００３１】デジタルカメラにおいてメモリに記憶されたデジタル画像データは、カードリーダやケーブルを介して画像サーバ２に記憶される。ここで画像サーバ２へのデータの複写方法は、ネットワークなども含め通常用いられているあらゆるデータ複写方法を用いることができる。

【００３２】一方、本実施の形態における画像再生装置３は、上記画像サーバ２に蓄積された画像ファイル７を順次再生処理するものであり、各画像ファイル７の画像データに対し画質を高めるための画像処理を施すセットアップ処理部11と、セットアップされた画像データをプリント14として出力するためのプリンタ12、あるいはモニタ15に表示するための表示インタフェース13などからなる。上記撮影情報９はこのうちセットアップ処理部11において演算に直接使用されたり、所定の処理を行うか否かの判定に使用されたりする。

【００３３】ここで、セットアップ処理部11は、撮影情報９に基づいて所定のアルゴリズムにしたがって演算を行い、最適な画像処理条件を求めて画像処理を行うものであるが、この際画像処理の処理条件10をさらに画像データ８に付与してもよい。これにより、例えば写真の焼き増しなどのためにプリントを行う場合に再度演算を行う必要がなくなり、時間およびコストの節約を図ることができる。また、プリントはモニタ表示に比べてより高い画質が要求されるため、プリントに合わせて一旦画像処理条件を求めて記憶しておけば、以降その画像データをモニタ表示する場合にはその情報を利用して短時間で高画質な画像を表示することができる。

【００３４】以上、プリントにおいて特に高画質が要求されることからラボシステムを例に説明したが、本発明は例えばパソコンで画像を鑑賞する場合などにも適用できるものである。すなわち上記ラボシステムと同様にパソコンにおいて撮影情報９を利用した画像処理を行うことによりモニタ上に高画質な写真画像を表示することが可能となる。

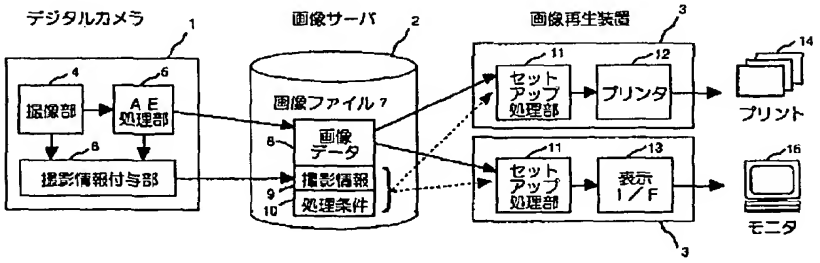
【図面の簡単な説明】

【図１】本発明の一実施の形態を示す図

【符号の説明】

1　デジタルカメラ
2　画像サーバ
3　画像再生装置
4　撮像部
5　ＡＥ処理部
6　撮影情報付与部
7　画像ファイル
8　画像データ
9　撮影情報
10　処理条件
11　セットアップ処理部
12　プリンタ
13　表示Ｉ／Ｆ
14　プリント
15　モニタ

【図１】



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